# Notes by Alexander Graham Bell, December 9, 1907

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1907, Dec. 9 Monday At Beinn Bhreagh.

(Dictated by A. G. B. to M. B. McC. Copied from Home Notes p. 13 by M. B. McC.).

It has been my experience in the past that the most important experiments leave few records behind them whereas the records of unimportant experiments bristle with details.

Unless I attempt now to give some details concerning the second (and last) flight of the "Cygnet" I am afraid I will never do so. Events crowd themselves upon me and in a short time the details will be blurred. Recollection distorts the facts of the past and is not to be implicitly trusted. It is now or never therefore with the "Cygnet" experiment and I must make an attempt while details are fresh in my mind although I am not in the humor for it.

Friday Dec. 6, 1907 is a day ever to be remembered. The "Cygnet" was placed on board the "Ugly Duckling" and towed by the "Gauldrie" down Beinn Bhreagh harbor, out into Baddeck Bay. The steamer Blue Hill was anchored at her usual mooring place and the tow line of the "Ugly Duckling" was made fast. The "Gauldrie" then returned to the Laboratory for our party. Lieut. Selfridge was on the "Ugly Duckling", Mr. Baldwin and Mr. Douglas McCurdy were on the steamer Blue Hill, and I remained in the "Gauldrie". Mrs. Bell, Miss Georgina McCurdy, Miss Caroline McCurdy and Miss Mabel McCurdy were transferred to the steamer Blue Hill. I almost forgot to mention that witness who will probably live longest after the event (and remember least about it)— my little grand-daughter Miss Mabel Grosvenor 2 years of age or a little older— accompanied by her nurse Miss Christina 2 127 Watson. When Mabel had been handed up to men on the Blue Hill all bundled up in wraps — Mabel not the men — we transferred Dr. McDonald from the Blue Hill to the "Gauldrie" so that he might be with me and keep close to the kite in case of any accident to

Lieut. Selfridge demanding medical or surgical assistance. Mr. Ingraham ran the “Gauldrie” and had as his assistants Mr. Byrnes and John McNeil both armed with cameras.

When the Blue Hill started to tow the “Ugly Duckling” up the Bay towards Baddeck, the “Gauldrie” left her for the Central Wharf where we picked up a row-boat containing John McLean and John McDermid. The plan was for the “Gauldrie” to keep close to the kite and tow a row-boat to the scene as quickly as possible after the kite came down. Our function was in other words — the rescue of the aviator after his descent. Mr. Bedwin, superintendent of the Laboratory,was in charge of the Clinometer and Mr. Douglas McCurdy had charge of observations of wind velocit y and of photographs taken from the Blue Hill. A complete list of witnesses, so far as I have been able to recall them, is contained in my Home Notes for Dec. 7, 1907 p. 199 — the last page in the book.

As the Blue Hill towed the “Ugly Duckling” up the Bay, the “Gauldrie” rejoined the procession. We passed behind the “Ugly Duckling” and I saw ( Lieut. Selfridge lying down in the manhole of the “Cygnet”. ( He lay on his face on the ladder floor provided, covered up with rugs to keep him warm for he was lightly clad in oil-skins and long, woolen overstockings without boots. ) The weather was cold but he had to be prepared for a swim. The 3 128 procession proceeded out into the Little Bras d'or Lake beyond the “Point” so as to get good wind. There had been a powerful wind all the morning gradually changing from West to N.W. but at two o'clock, about the time when the Blue Hill started, the wind had fallen considerably and white-caps had disappeared from Baddeck Bay. It seemed doubtful therefore at first whether we could venture the attempt to raise the “Cygnet” with a man in her, On rounding the “Point”, however, we found white-caps on the Lake and wind enough to warrant the experiment — a N.W. wind, I think, and evidently dimminishing gradually in force; it was indeed the dying out wind of a cyclone that had passed over or near Cape Bre-Breton Island.

The Blue Hill steamed well out into the Lake and turned to face the wind — the critical moment had come. The wind was not sufficiently strong to give complete warrant of

success so that I feared that the “Cygnet”, if she failed to rise, would be tumbled over into the waters of the Lake. John McLean and John McDermid, therefore, took their positions in the row-boat so as to be all ready for an emergency and Mr. Byrnes sat in the stern of the row-boat with a life preserver ready to throw it to Lieut. Selfridge should he need help, and John McNeil, on the “Gauldrie”, stood ready to cast off the row-boat at a moments notice. I came to the conclusion that we had made a mistake in attempting to tow a boat to the scene, for the row-boat, especially when loaded with men, cut down the speed of the “Gauldrie” so that we could not keep up with the Blue Hill and fell somewhat astern.

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129 We watched the men on the “Ugly Duckling” with anxious eyes and at last saw them cutting loose the lashings of the kite and making preparations to lift the tilting-frame and allow the “Cygnet” to take the air. The tilting-frame was raised but the “Cygnet” did not rise, it simply slipped a little way on the frame. The front of the tilting frame was then depressed and the kite was hauled back into position.

Lieut. Selfridge evidently appreciated the cause of the difficulty, namely, that the centre of gravity was too far forward to enable the kite to rise in the existing wind, for we saw him shift his position backwards until his feet projected from the rear of the kite.

The tilting-frame was then again raised and this time the “Cygnet” rose slowly and gracefully into the air and flew steadily at an elevation of over 100 feet amid the cheers of all spectators. The calculations on board the Blue Hill gave a vertical height of about 168 feet above the surface of the Lake. The ascent began so slowly that I feared a disaster for it appeared from the “Gauldrie” that one wing could not have been more than one or two feet from the surface of the water after the kite first took the air. If, as we had originally proposed, we had placed a load of lead in the kite instead of a man we would cerainly have lost the kite, but we had the advantage of live load, instead of dead load — an intelligent load not mere weight. Lieut. Selfridge evidently appreciated the needs of the situation and drew still further back in the kite. Under this treatment the kite recovered

5 130 itself and rose steadily to its full elevation. Finding the “Gauldrie” lagging behind we took the men out of the row-boat and were then able to make up some of our lost distance although the boat was evidently a drag that should be avoided in any further experiments of this character. It would have been better to have had the row-boat let off from the “Ugly Duckling” so that the “Gauldrie's” speed should not have been reduced at the time when her services were most needed. While in the air Lieut. Selfridge moved forward as far as was consistent with the proper flight of the kite and took observations of the inclination of the kite to the horizon, finding the kite body inclined at an angle of 20°. He then began to make observations of the velocity of the wind taking readings from an Anemometer and a stop watch, but these readings were not completed because, after only seven minutes in the air, the kite began to come down on account of a decrease in the velocity of the wind. The bow of the “Cygnet”, which had originally been made of open frame work, had been covered in below with silk. This cut off Lieut. Selfridge's view of the water in front and, on account of the inclination of the kite, shielded him from the wind so that he experienced little or no wind while stretched at full length on the floor of the man-hole. The oblique surfaces of the cells beneath him cut off his view below and the kite came down so slowly and gently that he was not aware of the fact that the kite was falling until it touched the water and so had no time to pullout the plug that would have rel 6 131 water and so had no time to pull out the plug that would have released the flying line. The kite came down on account of some variation in the force of the wind. Mr. Bedwin, I understand, was engaged at the time in attempting to get a reading of the pull of the kite, the steamer Blue Hill was steaming directly in the winds eye which caused her smoke to pass directly astern, obscurin g the view of the “Cygnet” in the air. Thus it happened, that both on the Blue Hill and on the “Cygnet”,the fact was not realized that the kite was coming down until too late to release the flying line. The kite could have been released at either end by cutting the rope at the Blue Hill or by pulling the plug on the “Cygnet”. Had Lieut. Selfridge noticed the descent of the kite on account of the slackening of the ind wind he also could have remedied the matter by moving backwards in the kite, thus enableing it to rise again to the old position, if this had been done the full program would

undoubtedly have been carried out. Lieut. Selfridge was provided with a small white flag. When he desired to come down he was to have dropped this flag, the Blue Hill would then have been stopped and Lieut. Selfridge would have pulled the plug at the moment of alighting on the water and Mr. Bedwin,on the Blue Hill, would have released the line at that end so as to allow it to become slack. Unfortunately, however, the “Cygnet” took the water before either Mr. Bedwin or Lieut.Selfridg e were prepared for the emergency,so after alighting gently and safely upon the water, Lieut. Selfridge found the kite being towed through the water at the full speed of the steamer Blue Hill 7 132 The inevitable then happened and the center part of the kite was ripped out by the strain and Lieut. Selfridge found himself in the water instead of upon it. The “Gauldrie” at this time was considerably to the rear of the kite and could not see what was going on in front. We observed the kite coming down and headed for her before she reached the water,we saw her settle down as gently as a butterfly and,just as we were congratulating ourselves that the experiment had come to a successful end, we saw the kite break in the middle and begin to sink. We knew then that a catastrophe had occurred but could see nothing of the Lieutenant. Mr. Byrnes stated afterwards that he saw Lieut. Selfridge leave the kite at the moment of the smash but no others on the “Gauldrie” knew anything of this. I feared that the Lieut. MIght have become entangled in the wreckage of the sinking kite and be in imminent danger. Unfortunately the “Gauldrie” was a considerable distance behind and was impeded in her efforts to reach the scene by the boat that the men she was towing and especially by the fact that the men clambered into the boat to be all ready to rescue the Lieu t the moment we reached the kite. It could not have been more than a minute or so before we rounded the wreck although it seemed, at the time, to be at least a half an hour. The moment we passed the kite we saw the Lieut. in the water swimming for his life, impeded of course by the clothing he wore. He immediately relieved our anxiety by calling out- “It's all right, it's all right, send the boat”. We then released the boat which rowed to him, and Mr. Byrnes, to the great indigination of the Lieut. threw him a life 8 133 preserver. He evidently thought this was adding insult to injury and refused its aid. He swam to the stern of the boat and clambered in aided by the men on board and all of us on the “Gauldrie”

heaved a sigh of relief. We gave him a hearty cheer as he came on board the “Gauldrie” where he immediately took refuge under the deck warming himself over the gasoline engine. By this time Mr. Bedwin had reached the kite in a row-boat from the steamer Blue Hill. We left our row-boat with him to help in the recovery of the remains, while the “Gauldrie” went full speed to the steamer Blue Hill and put the Lieut. on board. The ladies' cabin had been especially prepared for his benefit by being thoroughly heated. Under the supervision of Dr. McDonald the Lieut. was stripped, dried, and thoroughly rubbed down and the process was accompanied by the application of stimulants internally of a nature that seemed to give great satifaction to the Lieut! We were relieved to find that he had sustained no injury — not so much as a scratch although slivers of wood were extracted from his overstockings showing that he had a narrow escape from being stabbed by broken sticks. His escape from injury was undoubtedly due to his presence of mind at the moment of the catastrophe. Mr. Davidson, who was on board the Blue Hill, watched him narrowly at the time. He reports that the moment the smash occurred Lieut. Selfridge dived from the kite and swam away from the wreck. He saw him turn his head in the water to ascertain whether he was clear of the kite, he then swam back to inspect the wreck and hold on if necessary. His inspection was evidently unsatisfactory 9 134 for when we came up we found him in free water swimming round in a circle waiting for relief. We seemed to be so long in coming that he was about to support himself on one of the submerged floats which of course had considerable buoyancy although in a leaky condition, when he heard the noise of our engine and knew that relief was near. He therefore continued swimming until we appeared upon the scene.

Thus ended an eventful day.

Although the “Cygnet” has been so badly damaged that it is not worth while attempting repairs, she has fulfilled her function and has demonstrated the important fact that the Tetrahedral system can be utilized in structures intended for aerial locomotion.

In order to make the structure abundantly strong enough for the support of a man in the air she had been loaded with strengthening material to an unnecessary extent so that with Lieut. Selfridge on board she actually carried up in a 25 mile win d a dead load of four times her own weight. The cellular part of the structure, which of course supported all the rest, weighed 47.502 Kgms. about 104.6 lbs.. The whole kite, including a 175 lb. man and a 28 lb. flying rope weighed, when dry, 451 lbs.. The Lieut. however reports that the silk surfaces were all wet with spray adding, he thinks, at least 30 lbs. to the weight and there was also attached to the flying rope at the Blue Hill end of the line a spring balance and block and tackle so that he thinks that the whole weight supported by the kite could not have been less 10 135 than 500 lbs.. Thus the cellular part of the kite weighed about 100 lbs. while the whole kite load and all weighed 500 lbs. — the load being about four times the weight of the structure that supported it. This, I think, is a very encouraging result.

On Saturday Dec. 7, 1907 I was much gratified to receive a silver tray accompanied by the following note:— “December sixth, 1907 — a little token of appreciation, from the citizens of Baddec k, , to mark the date when Dr. A. Graham Bell successfully carried a man in the air in a Tetrahedral Aeroplane, or Flying Machine over the Bras d'or Lake.”

I spent Saturday and Sunday at the Houseboat recovering from the effects of the excitement. This evening (Monday, Dec. 9) I give a banquet to the men who have assisted in the experiments. About 32 people in all will sit down to supper to-night.

A. G. B.